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ABSTRACT

This investigation of the effect of typing skill on using a word processor for composition hypothesized that students who had learned keyboarding skills would: (1) write longer essays when using a word processor; (2) revise their essays more when using a word processor; (3) feel more positive about typing when using a word processor than students who had not learned keyboarding skills; and (4) continue to improve these skills if they were monitored while keyboarding their compositions. The 19 fourth grade students from a semi-rural university laboratory school in western Pennsylvania who served as subjects were randomly assigned to one of two treatments, i.e., one group received instruction in keyboarding via a typing tutorial, while the other group did not receive such instruction. Both groups then received instruction in a word processing program for use in writing. Results revealed no significant differences between the two groups in the length of their compositions, the total number of revisions they made, the types of revisions made, or their attitudes about using the word processor for writing. The results did support the fourth hypothesis, however, as the typing tutorial group showed significant gains in typing speed and accuracy after using word processing under supervision for four months. Limitations of the study are noted and areas for future research are suggested. A list of 24 references is provided, and an outline of categories for coding revisions on compositions is appended. (Author/MES)

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# THE EFFECT OF TYPING SKILL ON USING A WORD PROCESSOR FOR COMPOSITION

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# The Effect of Typing Skill on Using a Word Processor for Composition

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This study investigated the effect of typing skill on using a word processor for composition. Fourth grade students were randomly assigned to one of two treatments, use of a typing tutorial and no use of a typing tutorial prior to learning word processing for use in writing. Results indicated no significant difference in length of composition, total number of revisions, types of revisions or attitude about using the word processor for writing between the two groups. Under supervised conditions, the typing tutorial group showed significant gains in typing speed and accuracy four months later.

According to King (1978), the composing process in writing includes whatever occurs between the intention to write and the completion of the writing task. Included in this process are three stages: prewriting (preparing to write); articulation (production of the text); and, post-writing (evaluation and editing of the text). This is not a linear process, as writers are constantly planning and revising as they compose (Flower & Hayes, 1981).

Research has shown that revision is one of the most important aspects of the composing process but students don't receive much instruction on revising and they don't often revise their writing (Cronnell & Humes, 1981). Revision is viewed as punishment because with each change comes the need for tedious recopying (Schwartz, 1982). The recopying penalty can be reduced through the use of the computer and word processor (Moran, 1983; Papert, 1980). The use of word processing in the composing process makes revising easier because of ease in editing. Word processors allow students to add, delete, revise, and rearrange text. Text can also be saved for later revision.

There are those who recommend word processing to improve children's writing skills (Choate, 1982, Daiute, 1983; Green, 1984; Kane, 1983; O'Brien, 1984; Palmer, Dowd, & James, 1984; Schwartz, 1982). However, there is little research to confirm that word processing improves writing.

Results of informal observation and survey of attitudes about typing with a computer are evident in the literature. Based on observation Papert (1980) noted that using a word processor to compose can cause a child to move from total rejection of writing to intense involvement accompanied by improved quality. Palmer, Dowd, & James (1984) surveyed sixth graders and found that 75 percent of these students said writing with a computer was "easy" and "enjoyable" with 80 percent of the students wanting to continue word processing. All but one student thought their writing skills had improved. Whether the skills had actually improved was not assessed.

Few studies are available which evaluate whether writing skills improve when a word processor is used. In analyzing text of eighth grade students who used a microcomputer-based word processing system for composing, Kane (1983) found that most revisions were corrections of spelling and punctuation; however, there was some evidence that the computer could be used to promote involvement with composing, such as modifying individual words or phrases and focusing attention on the overall organization of the text. The word processor does not teach students to be better writers but provides a means to effect changes more easily. Word processing can not replace writing instruction. Teachers need to teach the writing process, guide writing of

compositions and provide feedback for revision (Balajthy, McKeveny, & Lacitignola, 1986-87).

One obstacle in using a word processor for writing is lack of knowledge of and skill in efficiently using the computer keyboard as it relates to typing skill. The hunt-and-peck technique of typing may occasionally be adequate for microcomputer operation but will not be suitable for later applications, such as typing text (Stewart & Jones, 1983). Loud (1982) found that it may take a student more than an hour to type a page or two which could be done in much less time by hand. Bradley (1982) noted that there was wide disparity in the typing skills of sixth grade students whom he studied. This disparity was also evident in a study by Kane (1983) in which some students who had instruction in touch typing knew the position of the fingers on the keyboard but were not proficient typists, while other students typed very slowly and laboriously. Wetzel (1985) observed third, fourth and fifth grade students with no touch typing instruction and found that the average rate of transfer of text from paper to screen was two and one-half gross words per minute (i.e. gwmp was defined as the total keystrokes for one minute divided by five without adjustment for errors). Little research is available to indicate the effect of keyboarding skill in using a word processor for composition.

The purpose of this study was to determine whether students' writing improved when they use keyboarding with a word processor. It was hypothesized that students who learned keyboarding skills would write longer essays when using a word processor, would revise their essays more when using a word processor, and would feel more positive

about typing when using a word processor than students who did not learn keyboarding skills. In addition, it was hypothesized that students who learned keyboarding skills would continue to improve these skills, if they were monitored while keyboarding their compositions.

## DESIGN OF THE STUDY

### Sample

The sample consisted of 19 middle-class fourth grade students from a semi-rural university laboratory school in western Pennsylvania. There were eight males and eleven females. Students who were learning disabled in the area of writing, as specified by their Individualized Educational Plan, were excluded from the study.

Fourth graders were chosen for this study because they are capable of learning keyboarding skills (Warwood, Hartman, Hauwiller, & Taylor, 1985). In addition, initial experiences with word processing are provided at the fourth grade level in this laboratory school.

### Procedure

Students' writing skills were pretested by giving them four stimulus pictures for story writing. The pictures were similar in color, size, and topic appeal for writing. Students were directed to choose one picture and write a story for which the picture could be an illustration. Following the preparation of the rough draft, students were directed to make any changes they thought necessary to improve their story and prepare a final draft. Both the rough and final drafts for this initial sample were prepared with pencil and paper.

Students were assigned by a stratified random procedure on the basis of sex and ability to one of two treatments, typing tutorial and

no-typing tutorial. This procedure produced two groups with the typing tutorial group having eight students and the no-typing tutorial group having eleven students. The typing tutorial group had to be limited to eight students due to the number of microcomputers available and the accessibility of the computer lab.

Following assignment to groups, the typing tutorial group began instruction in keyboarding (i.e., touch typing) using Microtype, The Wonderful World of Paws published by Southwestern Publishing Co., Cincinnati, OH. This tutorial includes 18 lessons of which 15 lessons were included as part of the research. These lessons included introduction to the tutorial, learning to touch type all letters of the alphabet and some special computer keyboard keys, and three sessions of open screen to practice typing passages. The lessons omitted were those dealing with symbols, numerals, and timed writing. Two lessons were practiced each week. Students worked on the each lesson for 25 minutes during which time their keyboarding skills were monitored for correct hand and finger position. At the conclusion of work with the typing tutorial, students were checked for typing accuracy and speed. On two different occasions within a week, they were individually asked to type a passage from a first grade achievement test for a period of two minutes. Each student's words per minute were calculated by subtracting the errors from the total number of words typed and dividing by two. Then, the two timed writings were averaged.

Concurrently with typing tutorial instruction, students in both treatments were introduced to Donald Graves' method of writing (Graves, 1983). This method involves allowing students to choose their own

topics for writing, occasional large group instruction on the writing process, and abundant peer and teacher conferencing. Topics included in the instruction were organization of a paragraph, including moving sentences, slotting for better word choice, and making meaning clearer by adding sentences and choosing better words. The mechanics of writing emphasized were sentence development, capitalization, and punctuation.

When the typing tutorial group had completed their lessons, students in both treatment groups were taught Acewriter, the word processor for use with the Franklin Ace 1000 and the Apple II series. This included deleting and inserting letters/words/lines, centering text, using upper case/lower case letters, paragraphing, underlining, splitting/gluing lines, and loading/saving/printing files. This instruction was spread over three half-hour sessions. Students were given a handout with a summary of the commands for Acewriter. At the conclusion of the instruction on use of the word processor, students in both treatment groups processed one composition. In this case, word processing meant typing in a handwritten rough draft that had been revised.

Following the completion of instruction and practice in word processing, students prepared a final sample of writing in the same way as the initial sample, except that they word processed their rough and final drafts. Again, students selected the topic for writing from the same set of pictures used for the initial sample. They were directed to use a different picture than they had chosen for the initial sample. Students prepared the rough draft and printed it. They revised it at their desks, made the changes at the keyboard, and printed the final

draft. All students in both groups chose to revise their rough drafts by making changes with pencil on the rough draft. The period from the preparation of the initial sample to the preparation of the final sample covered a period of three months. Instruction related to revision skills continued during this period.

Two months later, the typing tutorial group resumed word processing their compositions. They spent four half-hour periods each week for three weeks at the computer. During this time, they were supervised for retention of keyboarding skills. If errors in hand position and fingering were noted, they were reminded of correct positions.

RESULTS

Analysis of covariance was used to determine if students in the typing tutorial group had written a significantly greater number of words in their compositions when using the word processor than the no-typing tutorial group. The increase in number of words from rough to final drafts on the initial sample was the covariate, while the increase in number of words from the rough to final drafts on the final sample was the dependent variable. There was no significant difference between the typing tutorial and no-typing tutorial groups in number of words produced, $F(1,16) = 1.89$, $p < .185$.

A comparison of the total number of revisions made by students in the typing tutorial group and the no-typing tutorial group was made using analysis of covariance. The number of revisions on the final draft of the initial sample was the covariate, while the number of revisions on the final draft of the final sample was the dependent variable. There was no significant difference between the total number

of revisions made by the typing tutorial group and the no-typing tutorial group, although the results approached significance, $F(1,111) = 2.65$, $p < .102$.

Bridwell's (1980) categories for revision of compositions was used to code changes students made from rough to final drafts (see Appendix A). These categories include coding revisions at the surface level, lexical level, phrase level, clause level, sentence level, and multi-sentence level. For each of Bridwell's (1980) levels, analysis of covariance was used to determine if students in the typing tutorial group had made a significantly greater number of revisions in their compositions when using a word processor than the no-typing tutorial group. Each level was analyzed separately. The number of revisions on the final draft of the initial sample was the covariate, while the number of revisions on the final draft of the final sample was the dependent variable. There was no significant difference in revisions between the typing tutorial group and the no-typing tutorial group at any of the levels. However, two levels of revision approached significance. They were revisions at the surface level, $F(1,16) = 3.45$, $p < .078$, and revisions at the phrase level, $F(1,16) = 3.09$, $p < .094$.

Following preparation of the final sample, students in both groups continued to word process their compositions. Three months after the final sample had been collected and students had been using word processing, students in the typing tutorial group and the no-typing tutorial group were asked to respond in writing to what they liked and disliked about word processing their compositions. Fifty percent of the

typing tutorial group and twenty-seven percent of the no-typing tutorial group indicated that they liked to type. No one in either group indicated a dislike for typing. Both groups indicated they liked to word process their compositions. Each student in the typing tutorial group listed an average of 2.75 reasons for enjoying using the word processor, while each student in the no-typing tutorial group listed an average of 2.45 reasons for enjoying using the word processor. In both groups each student averaged less than one reason for disliking word processing compositions.

A treatment by subjects analysis of variance comparing the keyboarding speed and accuracy of the typing tutorial group four months after typing tutorial instruction revealed that their typing skills had improved, $F(1,7) = 12.17$, $p < .010$. These scores ranged from 4.5 to 20.5 words per minute in November to 8.5 to 21.25 words per minute in March. The mean number of words per minute for November was 9.71, while the mean number of words per minute for March was 12.21.

## DISCUSSION

The results did not support the hypothesis that students who have learned keyboarding skills write longer compositions when using a word processor than those students who use the word processor without keyboarding skills. Other researchers have found that using a word processor for writing, upper elementary-aged students do not increase the length of the composition (Miller, 1984), especially when the time for writing is limited (Daiute, 1986). Teachers and researchers who have observed preadolescents using the computer for composition report that they write more, but research does not confirm that (Daiute, 1985).

However, these studies did not include emphasis on keyboarding skills. Apparently having keyboarding skills does not insure that students will write more. It may be that the keyboarding skills acquired by the students in the typing tutorial did not enable them to be proficient enough to utilize this skill to its fullest extent. Daiute (1986) concluded that junior high school students apparently need more than an hour a week for six months to become a skilled in using a word processor as they are with a pen. In this study the time for learning keyboarding and the word processor may have been inadequate for proficiency.

The results did not support the hypothesis that students with keyboarding skills would make a significantly greater number of revisions to their compositions than those students who did not have keyboarding skills. When revisions were analyzed by categories, including revisions at the surface level, lexical level, phrase level, clause level, sentence level, and multi-sentence level, the typing tutorial group did not make a significantly greater number of revisions in any category than the no-typing tutorial group. Daiute (1985) noted that evidence from studies indicates that word processing is an aid to writing for students but students must learn how to revise to make the best use of the word processor. Students involved in this study with the typing tutorial and no-typing tutorial had some experience with revision skills. As with the use of the typing tutorial and word processor, perhaps, they had not reached the level of proficiency in revising skill needed for application.

The hypothesis that students who learned keyboarding would feel more positive about typing when using a word processor was not

supported. The student survey of likes and dislikes related to using the word processor for composition indicated that slightly more students in the typing tutorial group liked to type their compositions than those in the no-typing tutorial group. No one in either group indicated a dislike for typing. Students in both groups indicated an enjoyment for using the word processor, in general. That students enjoy using the word processor for composition is supported by other studies (Levin, Riel, Rowe & Boruta, 1985; Palmer, Dowd, & James, 1984; Papert, 1980). However, assessment of student attitude is not common in the limited number of students which focus on the utilization of a typing tutorial for use with a word processor.

There was support for the hypothesis that students who learned keyboarding would continue to improve their typing skills in terms of speed and accuracy. Four months later the students' speed and accuracy had shown significant improvement. The students in the typing tutorial group were subjected to additional supervised practice beyond completion of the typing tutorial. Wetzel (1985) noted that following learning keyboarding skills, typing speed and accuracy should continue to improve, as students use the computer for academic tasks, especially if the teacher follows up on previous instruction. Keyboarding skill declines if continuous and consistent reinforcement of keyboarding instruction is discontinued (Warward, Hartman, Hauwiller, & Taylor, 1985).

This study had limitations. First, the number of subjects was too small for adequate analysis and generalization to other populations. Second, the period of time for becoming proficient in using keyboard

skills, learning the word processor, and learning revision skills was too short. Apparently, more than the allotted three months was needed for students to learn and apply these skills.

Other research studies emerge from this study. Replication of this study with a longer time period, as well as a larger sample would extend this study. A study with greater emphasis on revision skills, with students who had keyboarding and word processing skills would help clarify the issue of how much revision of writing can be learned and applied at the upper elementary level. So little research has been done on the use of typing tutorials, that studies such as those which indicate the optimum age level at which to begin teaching keyboarding skills and/or word processing would contribute to that base of knowledge.

REFERENCES

Balajthy, E., McKeveny, R., & Lacitignola, L. (1986-87). Microcomputers and the improvement of revision skills. The Computing Teacher, 14(4), 28 - 31.

Bradley, V. N. (1982). Improving students writing with microcomputers. Language Arts, 59, 732 - 738.

Bridwell, L. S. (1980). Revising strategies in twelfth grade students' transactional writing. Research in the Teaching of English, 14(3), 197 - 222.

Choate, J. (1982). CCN forum: Word processing - how will it shape the student as writer? Classroom Computer News, 3(2), 24 - 27; 74 - 76.

Cronnell, B., & Humes, A. (1981). Using microcomputers for composition instruction. Paper presented at the Conference on College Communication, Dallas, TX. (ERIC Document Reproduction Service No. ED 203 892)

Daiute, C. (1983). Writing, creativity and change. Childhood Education, 59, 227 - 231.

Daiute, C. (1985). Writing & computers. Reading, MA: Addison-Wesley.

Daiute, C. (1986). Physical and cognitive factors in revision: Insights from studies with computers. Research in the Teaching of English, 20(2), 141 - 159.

Flower, L., & Hayes, J. R. (1981). A cognitive process theory of writing. College Composition and Communication, 32, 365 - 387.

Graves, D. H. (1983). Writing: Teachers & children at work

Exeter, NH: Heinemann.

Green, J. O. Computers, kids and writing: An interview with Donald Graves. Classroom Computer Learning, 4(8), 21 - 23; 28.

Kane, J. H. Computers for composing. Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Canada. (ERIC Document Reproduction Service No. ED 230 978)

King, M. L. (1978). Research in composition: A need for theory. Research in the Teaching of English, 12, 193 - 202.

Levin, J., Riel, M., Rowe, M., & Boruta, M. (1985). Muktuk meets jacuzzi: Computer networks and elementary school writers. In S. Freedman (Ed.), The acquisition of written language: Response and revision. Norwood, NJ: Ablex.

Loud, B. (1982). CCN forum: Word processing - how will it shape the student as a writer? Classroom Computer News, 3(2), 24 - 27; 74 - 76.

Miller, S. (1984). Plugging your pencil into the wall: An investigation of word processing and writing skills at the middle school level. (Doctoral dissertation, University of Oregon, 1984). Dissertation Abstracts International, 45. 3535A

Moran, C. (1983). Word processing and the teaching of writing. English Journal, 73(3), 113 - 115.

O'Brien, P. Using microcomputers in the writing class. The Computing Teacher, 11(9), 20 -21.

Palmer, A., Dowd, T., & James, K. (1984). Changing teacher and student attitudes through word processing. The Computing Teacher, 11(9), 45 - 47.

Papert, S. (1980). Mindstorms - children, computers, and powerful ideas. New York: Basic Books.

Schwartz, M. (1982). Computers and teaching of writing. Educational Technology, 22(11), 27 - 29.

Stewart, J., & Jones, B. W. (1983). Keyboarding instruction: Elementary school options. Business Education Forum, 37, 11 - 12.

Warwood, B., Hartman, V., Hauwiller, J., & Taylor, S. (1985). A research study to determine the effects of early keyboard use upon student development in occupational keyboarding. Bozeman, MT: Montana State University. (ERIC Document Reproduction Service No. ED 265 367)

Wetzel, K. (1985). Keyboarding skills: Elementary, my dear? (1986). Eugene, OR: The International Council for Computers in Education.

## APPENDIX A

### BRIDWELL'S CATEGORIES FOR CODING REVISIONS ON COMPOSITIONS

1. Surface Level
   - 1.1 Spelling
   - 1.2 Punctuation
   - 1.3 Capitalization
   - 1.4 Verb form
   - 1.5 Abbreviations vs. full form
   - 1.6 Symbols vs. full form
   - 1.7 Contractions vs. full form
   - 1.8 Singular vs. plural
   - 1.9 Morphological conditioning
   - 1.10 Interlinear and marginal notations related to above
2. Lexical Level
   - 2.1 Addition
   - 2.2 Deletion
   - 2.3 Substitution (synonyms, pronouns)
   - 2.4. Order shift of single words
   - 2.5 Interlinear and marginal notations related to single words
3. Phrase Level
   - 3.1 Addition
   - 3.2 Deletion
   - 3.3 Substitution/alteration
   - 3.4 Order shift of complete phrase
   - 3.5 Expansion of word to phrase
   - 3.6 Reduction of phrase to word
   - 3.7 Interlinear and marginal notations related to phrases
4. Clause Level (Subordinate or independent not punctuated as sentence)
   - 4.1 Addition
   - 4.2 Deletion
   - 4.3 Substitution/alteration
   - 4.4 Order shift of complete clause
   - 4.5 Explansion of word or phrase to clause
   - 4.6 Reduction of clause to word or phrase
   - 4.7 Interlinear and marginal notations related to clauses
5. Sentence Level (as punctuated by student)
   - 5.1 Addition
   - 5.2 Deletion
   - 5.3 Substitution/alteration
   - 5.4 Order shift of complete sentence
   - 5.5 Expansion of word, phrase, or clause to sentence (includes de-coordination)
   - 5.6 Reduction of sentence to word, phrase or clause (includes coordination)
   - 5.7 Transformation
   - 5.8 Interlinear and marginal notations related to sentences

6. Multi-sentence Level
(two or more consecutive sentences, categories 6.1-6.5 tallied once for each sentence involved)
   - 6.1 Addition
   - 6.2 Deletion
   - 6.3 Substitution/alteration
   - 6.4 Order shift of two or more sentences
   - 6.5 Reduction of two or more sentences to single sentences (excepting those changes accounted for by category 5.6, clause, phrase or word)
   - 6.6 Indention
   - 6.7 De-indention
   - 6.8 Interlinear and marginal notations related to multiple sentences

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